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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/843,622	04/26/2001	John S. Petersen	2790.1001-001	7679

21005 7590 08/29/2003

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EXAMINER

SAGAR, KRIPA

ART UNIT

PAPER NUMBER

1756

DATE MAILED: 08/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding:

**Office Action Summary**

Application No.

09/843,622

Applicant(s)

PETERSEN, JOHN S.

Examiner

Kripa Sagar

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 June 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7, 10-19 and 69-87 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-7, 10-19 is/are allowed.
- 6) ☒ Claim(s) 69, 70, 73, 74 and 76-87 is/are rejected.
- 7) ☒ Claim(s) 71, 72 and 75 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. The amendment filed 6/5/03 has been entered.

Claim 1 has been amended. Claims 8,9, 38-68 have been cancelled. New claims 69-87 have been added; no new matter has been introduced by the amendment. Claims 1-7,10-19,69-87 are under consideration.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 69,70,73,74,76-87 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat.5229230 to Kamon in view of US Pat. 5316896 to Fukuda et al.

The claims recite forming a phase shift mask with assist features, designed by Fourier transform (FT) of the pattern, wherein the assist features modulate the zero-order intensity to a *desired level* similar to a weak phase shift mask.

Kamon teaches a phase shift mask with assist features wherein assist features modulate the zero order intensity to enhance contrast (Figs.1,2,3,11; & 3;16-33).

Kamon does not design the mask using Fourier transform.

Fukuda teaches designing a mask using FT. The image pattern is analyzed using FT (Fig.1) The inverse transform provides the mask layout pattern (3;34-41).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use FT to design a mask as taught by Fukuda to design Kamon's phase shift mask; because Fukuda teaches that the design method enables a mask with large depth of focus and high image quality to be obtained at the same time (abstract).

***Allowable Subject Matter***

4. Claims 1-7,10-19, are allowed.
5. Claims 71,72,75 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is an examiner's statement of reasons for allowance:

The amended claim 1 recites a strong phase shifting mask with assist features wherein the zero order frequency is annulled. Kamon's invention does not teach a strong phase shifting mask as argued by the Applicant.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Response to Arguments***

7. Applicant's arguments were considered in allowing the claims.

**Conclusion**

8. The rejection of claim 69 may be overcome by limiting the claim to strong phase shifting mask wherein the zero-order *intensity is substantially attenuated*. The degree of modulation may be variable but is always downwards. The term "desired amount of zero-order light" as recited in the claim would include the teachings of Kamon.

Claim 74 should be cancelled. Applicant has emphasized in the specification and arguments the strong phase shift mask wherein the zero-order intensity is annulled.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

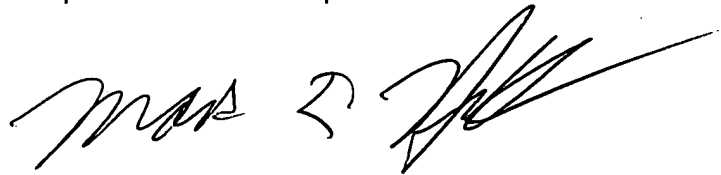
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kripa Sagar whose telephone number is 703-605-4427. The examiner can normally be reached on M-F.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on 703-308-2464. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

A handwritten signature in black ink, appearing to read 'Mark F. Huff', with a long, sweeping horizontal line extending to the right.

MARK F. HUFF  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700

MH/ks